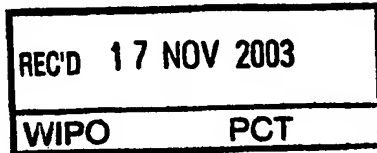


PCT/NZ03/00239



## CERTIFICATE

This certificate is issued in support of an application for Patent registration in a country outside New Zealand pursuant to the Patents Act 1953 and the Regulations thereunder.

I hereby certify that annexed is a true copy of the Provisional Specification as filed on 26 February 2003 with an application for Letters Patent number 524432 made by BARRY DOUGLAS ARMOUR.

Dated 5 November 2003.

**PRIORITY DOCUMENT**  
SUBMITTED OR TRANSMITTED IN  
COMPLIANCE WITH  
RULE 17.1(a) OR (b)



Neville Harris  
Commissioner of Patents, Trade Marks and Designs

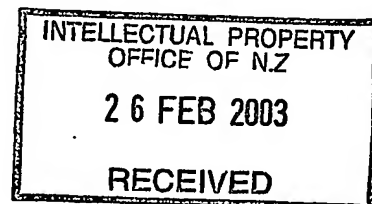


NEW ZEALAND PATENTS ACT 1953

PROVISIONAL SPECIFICATION

IMPROVED VEHICLE TRANSPORTER

I, BARRY DOUGLAS ARMOUR, a New Zealand citizen of 1 Bell Crescent, Concord, Dunedin, New Zealand, do hereby declare this invention to be described in the following statement:



# **IMPROVED VEHICLE TRANSPORTER**

## **Field of the Invention**

The invention relates to a truck deck which may tilt rearwardly towards the ground, with a gentle loading angle, to enable vehicles, livestock, freight, etc, to be loaded and unloaded with ease.

## **Background**

Vehicle carriers of this kind are known to have a deck that angles permanently down, from the rear wheels to the back of the deck. These decks have long ramps to achieve the angle required. These are usually stored under the deck or hinged up the back of the deck.

## **Summary of the Invention**

In broad terms, the invention consists in a truck including: a front chassis part and a deck, the front chassis part including a cab and the deck being supported at least by a rear axle and wheels; wherein the deck is tiltable about a pivot axis located in front of the rearmost axle of the truck to enable the loading and unloading of vehicles onto the truck.

Preferably, the truck deck includes rope rails and/or chains attached to the deck to enable vehicles or goods to be secured to the deck via attachment to the rope rails or chains.

Preferably, the truck deck has a tail-door type ramp hingedly attached to its rear to enable ease of loading and unloading of vehicles and goods onto and off the deck.

Preferably, the ramp is hinged to be folded along its length and supported by a rigid member along the underside of its fold-line.

This invention may also be said to broadly consist in the parts, elements, and features referred to or indicated in the specification, individually or collectively, and any or all combinations of any two or more said parts, elements, or features; and where specific equivalents are mentioned herein, which have known equivalents in the art to which this invention relates, such known equivalents are deemed to be incorporated herein as if individually set forth.

#### **Brief Description of the Drawings**

Preferred embodiments of the invention will be described, by way of example only, with reference to the accompanying figures in which:

Figure 1 is a perspective view showing a truck, according to one preferred form of the invention, having a deck upon which a vehicle is positioned for transportation;

Figure 2 is a rear elevation view showing a truck, according to one preferred form of the invention, having a deck in a tilted position for loading and unloading of vehicles onto the truck deck.

Figure 3 is a schematic view from underneath the truck of Figures 1 and 2, showing important elements of the chassis and deck.

Figure 4 is a schematic side view of the truck with the deck in its normal position.

Figure 5 is a schematic side view of the truck having a deck in a tilted position for loading and unloading.

Figure 6 is a schematic side view showing a truck, according to another preferred form of the invention, having a tandem rear axle and a deck in the horizontal transport position.

Figure 7 is a schematic side view showing the truck of Figure 6, having a deck in a tilted position for loading and unloading vehicles onto the truck deck.

Figure 8 is a view of a portion of one side of the truck deck showing looped chains positioned on the deck for securement of vehicles to the deck.

### **Detailed Description of Preferred Forms**

While the description of the preferred embodiments below makes reference to a truck having a cab and a deck, it will be appreciated that at least some of the features described will also have application to trailers which are towed by a separate tractor unit.

Figures 1 to 5 show one preferred form, which includes a truck having a cab 1, a deck 2 and at least two pairs of wheels, being front wheels 7 and rear wheels 3. It is envisaged that more wheels will be required for heavier loading. The cab 1 is supported by a front chassis part whilst the deck 2 acts as a rear chassis part. The two chassis' parts are pivotally connected such that front chassis part 5, and therefore the cab 1, are able to tilt forward, whilst the truck deck 2 is able to tilt backward simultaneously to a point on or near the ground surface as shown in Figures 2 to 5; thus enabling a vehicle 6 to be loaded or unloaded onto or off the truck deck.

In an alternative embodiment, the deck may be mounted on a separate rear chassis part.

As shown in Figures 3 to 5, a chassis subframe 16 is attached to the front chassis part 5, via bolts, welds, or the like. The subframe 16 is pivotally engaged with the deck 2 via pivot point 14 such that the subframe is able to tilt in a forward direction with the cab 1, while the deck tilts rearwardly.

The pivot axis 14 between the chassis subframe 16 and the deck 2 is located in front of the rear axle that supports rear wheels 3. This enables a relatively shallow angle of incline for vehicles, etc., loading and unloading onto and off the truck deck 2.

As shown in Figure 5, a hydraulic ram 13, or other tilt actuating means, is connected at one end to the front chassis part 5 and at the other end to the deck part 2. Upon actuation of the hydraulic ram, or other tilt actuating means, the cab 1 and front chassis part 5 tilt in a forward direction. The front chassis part 5 and deck part 2 pivot about point 14 causing the deck part 2 to tilt rearwardly and enable the loading and unloading of vehicles, etc.

The truck may use leaf spring rear suspension in a preferred form; although other types of suspension systems may also be used, such as air bag suspension, for example.

Figures 3 to 5 illustrate a truck having leaf spring rear suspension. The front ends of the springs are attached to the rear ends of the subframe at front spring support 18, and the rear ends of the springs are attached to deck cross member 17.

When the deck 2 is tilted, either manually or mechanically, the rear suspension front spring support 18 moves towards the deck, reducing the clearance between the top of the rear wheel 3 and the underside of the deck 2. This could also be achieved by altering the shape of the chassis and springs, forward of the rear axle.

A similar type of deck can be fitted to a truck with tandem rear axles, with leaf spring or air bag suspension, having a pivot point forward of the rearmost axle. A strengthened deck may take place of the rear portion of chassis.

The truck deck 2 may have a textured surface to provide grip for the wheels of vehicles being transported. The truck deck 2 may also have rails 11 along its sides to prevent slipping vehicles from falling from the side of the deck 2.

The rails 11 may be provided with apertures 12 through which cables and/or other tie downs, or the like, may be threaded to assist in the securement of transported vehicles. The apertures 12 may be positioned directly adjacent the surface of the deck 2 to provide drainage should the deck be wet.

A ramp 4 may be hingedly attached to the rear of the truck deck and stored in an upright position, similar to that shown in Figure 1, during transportation of the vehicle(s) 6. In this position, the ramp 4 is locked in place by bolts, a locking bar, or the like, such that the ramp 4 may serve as a barrier should the rear vehicle 6 break free of its clamps, tie-downs, or other securements, and roll towards the rear of the deck 2.

As shown in Figure 2, the ramp 4 is lowered outwardly to a point on or near the ground surface to provide smooth access for a vehicle 6 being loaded onto the truck deck 2 or offloaded from the deck 2. A rigid supporting member 8 may be positioned along the length of the underside of the ramp 4 to provide additional strength and support. Preferably, the rigid supporting member 8 is permanently mounted on ramp 4.

In an alternative embodiment, the ramp 4 may be hinged along fold-line 9 in addition to being hinged to the rear of the deck 2 along hinge line 10. In this form, the ramp 4 is folded along its fold-line 9 and then raised into the vertical storage position (as shown in Figure 1) where it is locked in place by bolts, a locking bar, or the like. A rigid supporting member 8 is positioned along the underside of the ramp 4 and overlaps the fold-line 9 to provide strength and support and to prevent the fold-line 9 from folding inwards when stressed by a weight such as that imparted from a loading vehicle. Preferably, the rigid supporting member 8 is permanently fixed to the ramp 4 on one side of the fold-line 9.

The ramp 4 may have a textured surface to provide grip and may also include apertures to provide drainage for the deck.

The ramp 4 may be raised and lowered manually or mechanically by motorized means.

During transportation of the vehicle(s) 6, the vehicles are tied down, clamped, or otherwise secured to the truck deck. The ramp 4 is raised to its vertical storage position and the chassis' are returned to their substantially horizontal positions so that the cab 1 and deck 2 return to their horizontal transportation state, as shown in Figure 1.

The tilt positioning of the chassis' may be controlled manually or mechanically by a tilt actuating member such as a hydraulic ram. Alternatively, the tilt positioning of the chassis' may be controlled by motorized or pneumatic means.

Figures 7, 8, and 9 show another preferred form, which includes a truck having a cab 1, a deck 2, at least one pair of front wheels 7, and rear wheels 3, which in this case comprises a tandem axle in the rearmost position.

A pivot point 18 is mounted in front of the rearmost axle. A hydraulic ram 13, or other tilt actuating means, is connected at one end to the chassis part 15 and to the deck 2. Extension of the ram 13 causes the deck 2 to tilt in a rearward direction to enable vehicles to be loaded or unloaded onto or off the truck deck.

The tilt pivot axis is located in front of the rearmost axle that supports rear wheels 3 to allow a relatively shallow angle of incline for vehicles loading and unloading onto and off the truck deck 2.

The chassis ends at a point just behind the pivot axis and is replaced with reinforced runners to support the deck 2 and to allow the deck to tilt.

The truck deck may have a textured surface to provide grip for the wheels of vehicles being transported.

The truck deck may also be provided with looped chains 16, as shown in Figure 8. The chains may be affixed to the topside or underside of the deck 2 by bolts, a locking bar, or



the like, to allow a vehicle to be secured to the deck via attachment to the chains using a racking bar or the like.

The truck may use leaf spring suspension, or in a preferred form, air bag suspension for the rear wheels 3 so that air may be released to further lower the deck toward the ground for a shallower angle of tilt.

A ramp 4 may be hingedly attached to the rear of the deck and stored in an upright position, similar to that shown in Figure 1, or the ramp may be folded under the deck and secured in a transport position, as shown in Figure 5.

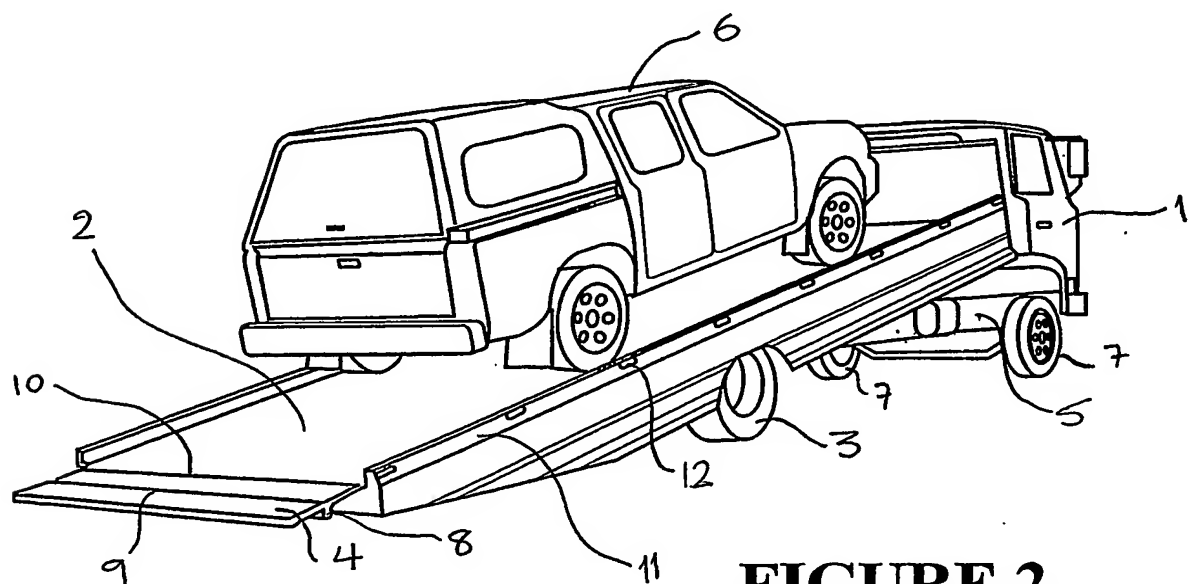
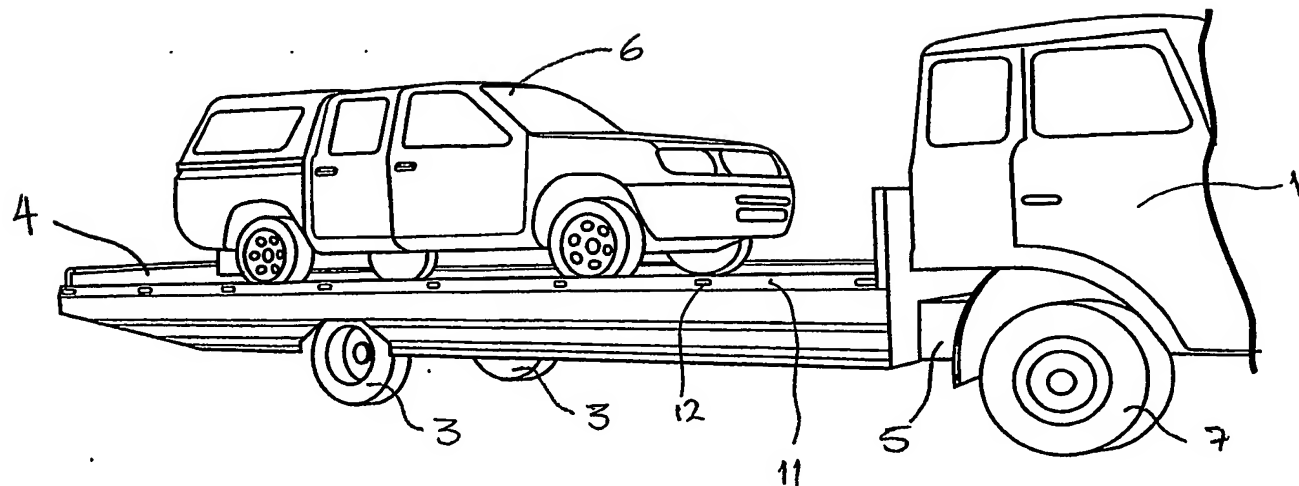
To enable the onloading and offloading of vehicles, the ramp 4 is unfolded to become level with the deck 2. The ramp 4 may have an angled bottom edge 14 for closer positioning to the ground when the deck 2 is in the tilted position.

The ramp may be moved to and from the loading and transport positions either manually or mechanically by motorized means.

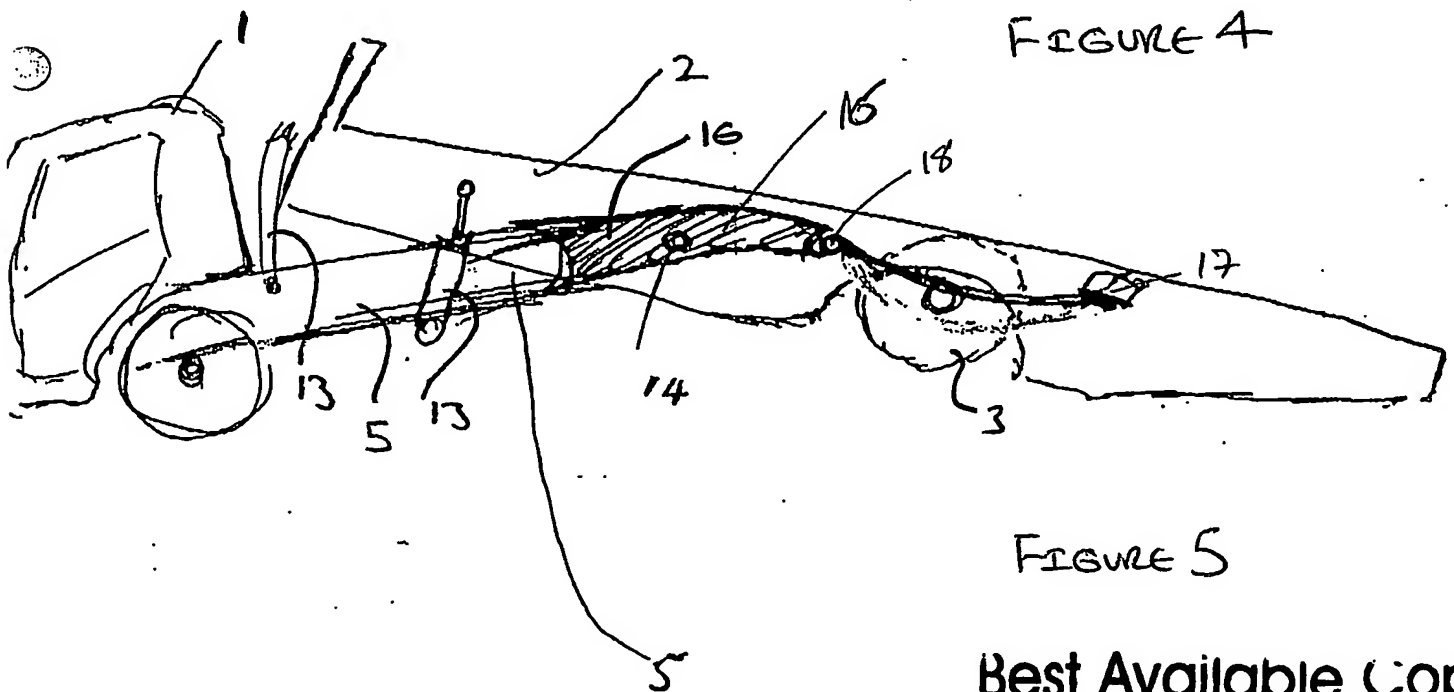
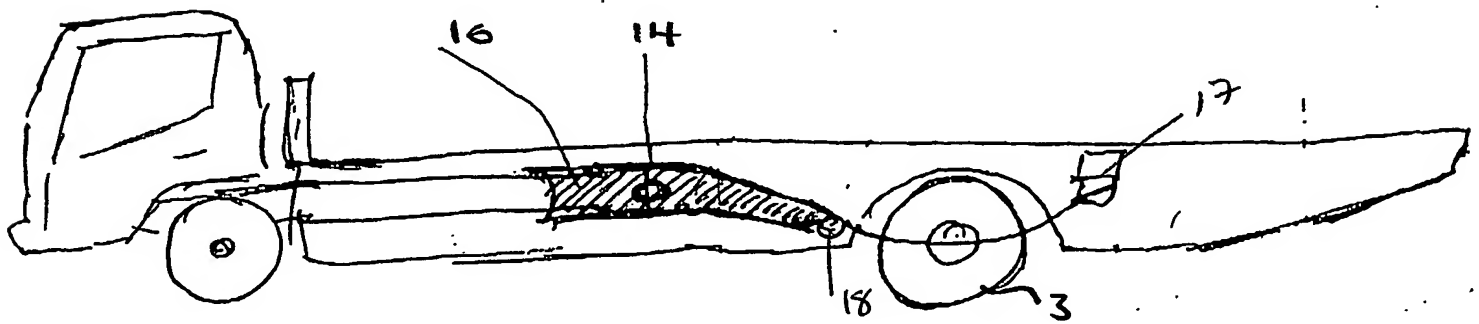
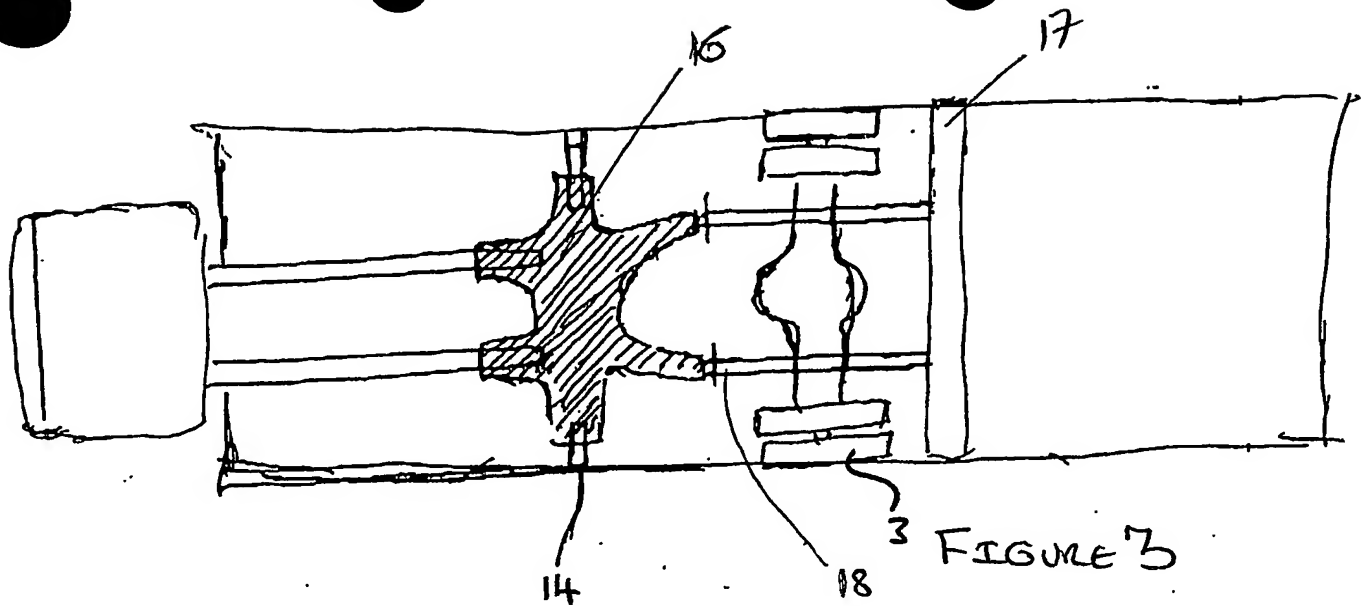
Preferred forms of the invention have been described by way of example only and it should be appreciated that modifications and additions thereto may be made without departing from the scope of the invention.



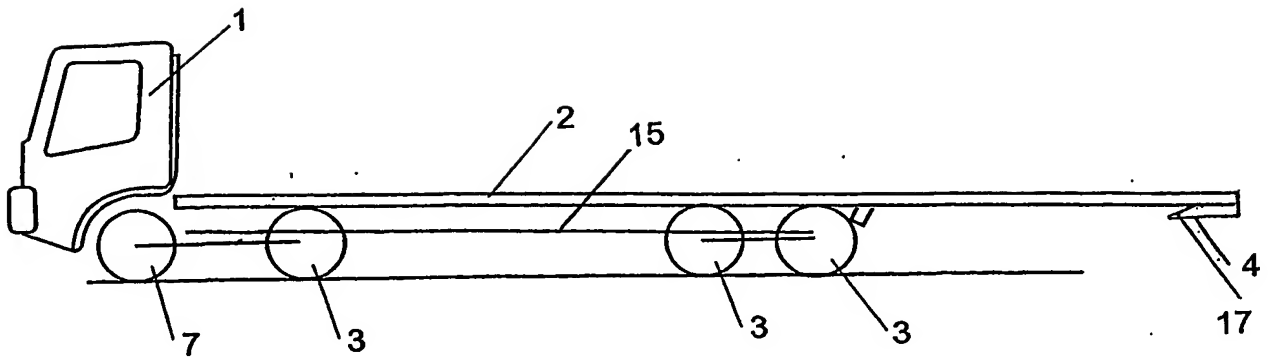
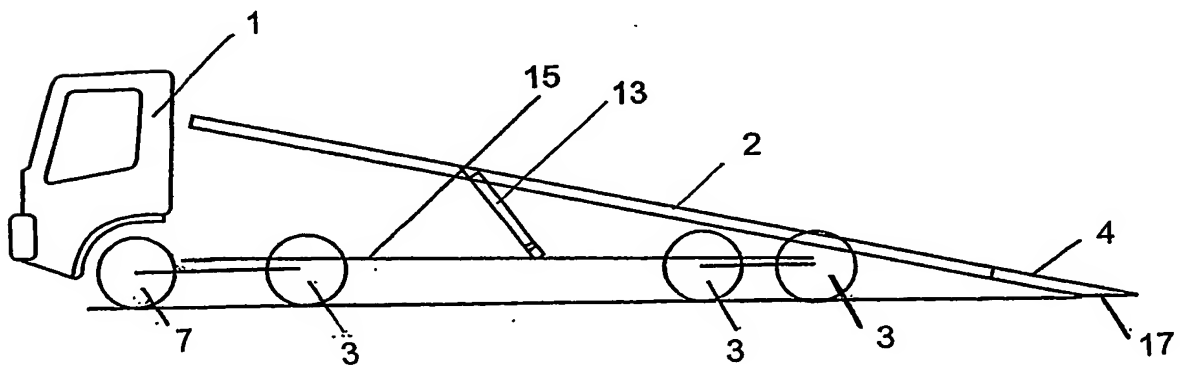
**FIGURE 1**



**FIGURE 2**



Best Available Copy

**FIGURE 6****FIGURE 7****FIGURE 8**